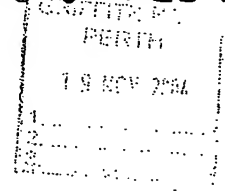


PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)



Applicant's or agent's file reference SJS:FP18145	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).	
International Application No. PCT/AU2003/000994	International Filing Date (day/month/year) 6 August 2003	Priority Date (day/month/year) 7 August 2002
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ G06F 9/50, 12/00		
Applicant MMAGIX TECHNOLOGY LIMITED et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheet(s).

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 16 February 2004	Date of completion of the report 12 November 2004
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer P. THONG Telephone No. (02) 6283 2128

I. Basis of the report**1. With regard to the elements of the international application:***

- ☒ the international application as originally filed.
- ☐ the description, pages , as originally filed,
 pages , filed with the demand,
 pages , received on with the letter of
- ☐ the claims, pages , as originally filed,
 pages , as amended (together with any statement) under Article 19,
 pages , filed with the demand,
 pages , received on with the letter of
- ☐ the drawings, pages , as originally filed,
 pages , filed with the demand,
 pages , received on with the letter of
- ☐ the sequence listing part of the description:
 pages , as originally filed
 pages , filed with the demand
 pages , received on with the letter of

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be nonobvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos: 17-100, 111-120, 173-619, 672-1118 and 1171-1614

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for said claim Nos: 17-100, 111-120, 173-619, 672-1118 and 1171-1614

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the standard.

☐ the computer readable form has not been furnished or does not comply with the standard.

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☐ paid additional fees.
- ☐ paid additional fees under protest.
- ☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
- ☒ not complied with for the following reasons:

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion this Authority has found that there are different inventions as follows:

1. Claims 1,122,144,621,643,1120,1142 and any relevant dependent claim(s).

Method, system or apparatus which involves the delegating of execution-instructions between processing resources via an instruction execution router.

2. Claim 17 and any relevant dependent claim(s).

Apparatus comprising memory that includes an instruction unit which memory may be accessed simultaneously by processing resources wherein the processing resources and memory are on the same die.

3. Claim 36 and any relevant dependent claim(s).

Apparatus comprising a memory cache disposed in communication with an instruction determination unit and an instruction execution unit wherein both units store values into the memory within a single cycle.

4. Claim 55 and any relevant dependent claim(s).

Apparatus comprising an arbitration unit that includes a priority bit comparator wherein the unit is communicatively disposed with processing resources.

5. Claim 75 and any relevant dependent claim(s).

A medium whose execution-instruction signals involve a processing resource identifier that identifies the origin of an execution signal and an operation code that identifies a target processing resource

6. Claim 85 and any relevant dependent claim(s).

Processor with an integer processing unit, math processing unit and a router that interfaces between the units wherein the router is adapted to route the request from the integer processing unit to the math processing unit.

7. Claim 101 and any relevant dependent claim(s).

Processor with processing units and a cache unit wherein each of the processing units is configured to sleep after sending an access request to the cache unit.

NOTE: See Supplemental Box II

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☐ all parts.
- ☒ the parts relating to claims Nos. 1-16,101-110,121-172,620-671,1119-1170 (for which searches were done)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/AU2003/000994

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 121,620,1119	YES
	Claims 1-16,101-110,122-172,621-671,1120-1170	NO
Inventive step (IS)	Claims 121,620,1119	YES
	Claims 1-16,101-110,122-172,621-671,1120-1170	NO
Industrial applicability (IA)	Claims 1-16,101-110,121-172,620-671,1119-1170	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

D1 = US 5522083
D5 = EP 385136

D2 = EP 794492
D6 = US 6035374

D3 = US 5159689
D7 = US 5860158

D4 = US 4346435
D8 = US 5210828

NOVELTY (N): Claims 1-16,101-110,122-172,621-671,1120-1170

First invention (claims 1, 122, 144, 621, 643, 1120, 1142 and dependent claims)

Claim 1 and dependent claims:

Citation US 5522083 is relevant.

The abstract teaches that the entire image processor (apparatus) including individual processors (processing resources), the crossbar switch (router) and memories is contained on a single silicon chip.

The following applies when the image processor (apparatus) is in a SIMD mode (column 63 lines 18 to 54):

- Only one of several processors becoming a primary processor (column 36 line 25) which performs instruction fetch on behalf of the rest of the other processors (which becomes secondary processors - column 36 lines 12 to 16).
- the instruction is fetched when the main processor accesses via an instruction port the instruction from the instruction memory and supplies (delegates) via the switch matrix (router) to the instruction port of secondary processors the fetched instruction.

In view of such disclosures, the arrangement in the claims cannot be considered novel.

Claims 122,621,1120 and dependent claims:

The only difference between claim 1 and claims 122, 621 and 1120 is that the latter claims specify that the memory itself includes "instruction execution logic". It is uncertain as to the nature of this "instruction execution logic" and due to a lack of working interrelationship, it is uncertain if this logic within memory is essential. In any case, column 17 line 1 to column 20 line 11 shows that each crosspoint of the crossbar switch matrix (router) has logic circuitry for accessing memory. These logic circuitries could be considered as the "instruction execution logic" of the crossbar switch. As the crossbar switch and memory are linked and are furthermore found on the same die, then it could be said that the memory itself includes the "instruction execution logic" ie the crossbar switch forms part of the memory.

In view of such disclosures, the arrangement in the claims cannot be considered novel.

NOTE: Refer to Supplemental Box I

Supplemental Box I

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of Box V.2. Citations and explanationsClaim 1 and dependent claims:

Citation US 5159689 is relevant.

- The citation's processor includes three functional blocks with individual logic circuits (column 9 lines 48 to 49, figure 16, figure 24). The individual logic circuits of the blocks are processing resources.
- One of these circuits delegates tasks to another one of the circuits as required (column 18 lines 15 to 48).
- The tasks signals are sent to another via control gate circuit (router) (column 18 lines 42 to 48, column 19 line 61).

The disclosures in column 21 line 39 to column 22 line 43, column 23 line 67 to column 34, figure 29 and 35 in particular are also relevant. In view of such disclosures, the arrangement in the claims cannot be considered novel.

The disclosures in citations US 4346435 and EP 385136, being similar to those in citation US 5159689, also anticipate the claimed arrangement.

Claims 144,643,1142 and dependent claims:

Citation EP 794492 is relevant.

In the citation, a system/host CPU (1st processing resource) delegates to a slave processor when the system CPU is unable to execute the codes (column 3 line 49 to column 4 line 27). The slave processor then sleeps.

In view of such disclosures, the arrangement in the claims cannot be considered novel.

Second invention (claim 101 and dependent claims)

US 6035374 is relevant.

It features the following:

- several processors one of which is designated primary unit (column 7 lines 36 to 64, figure 3). The processor units (virtual) are effectively the processing units of the claims.
- Each processor unit is capable of executing independently (column 7 lines 11 to 15).
- All of the processors share a cache memory 105 (figure 1).
- Wherein after accessing a cache, a processor unit may go into a nap or a longer sleep mode (column 8 lines 8 to 34, column 16 lines 9 to 17).

In view of such disclosures, the arrangement in the claims cannot be considered novel.

INVENTIVE STEP (IS): Claims 1-16,101-110,122-172,621-671,1120-1170

As above.

Supplemental Box II - Continuation of Box IV.3. Lack of unity of invention**8. Claim 111 and any relevant dependent claim(s).**

Processor with internal and external cache units wherein the internal and external cache units is divided into instruction and data areas and the data areas are further subdivided into local and global areas.

9. Claims 121,620,1119 and any relevant dependent claim(s).

Method, system or apparatus that involves setting processing resources waiting on shared and locked memory being accessed by other processing resources to sleep until the memory is unlocked.

10. Claims 173,672,1171 and any relevant dependent claim(s).

Method, system or apparatus that involves determining a priority dead-lock-avoidance value wherein the value is used to select among multiple requests with equal priority

11. Claims 211,710,1209 and any relevant dependent claim(s).

Method, system or apparatus that involves preparing a response into a result register wherein the response includes a requesting processing resource identifier and presenting the response to all processing resources.

12. Claims 244,743,1242 and any relevant dependent claim(s).

Method, system or apparatus that involves waking a requesting processing resource if a requesting processing resource identifier identifies the instant processing resource and waking a processing resource if a processing resource is waiting to be unlocked.

13. Claims 278,777,1276 and any relevant dependent claim(s).

Method, system or apparatus that involves comparing a target memory address with register values wherein register values are used to establish a data type of the target memory address for subsequent storage in an apportioned region of cache memory.

14. Claims 319,818,1317 and any relevant dependent claim(s).

Method, system or apparatus that involves a literal constant and a literal prefix relating to a reduced size execution of execution-instructions.

15. Claims 360,859,1358 and any relevant dependent claim(s).

Method, system or apparatus that involves replacing odd address value in an instruction register with an even address found in a binding name table.

16. Claims 118,395,617,894,1116,1393 and any relevant dependent claim(s).

Method, system or apparatus that involves a status register as well as addressing a register specified by a register address or cycle flags.

17. Claims 431,930,1429 and any relevant dependent claim(s).

Method, system or apparatus that involves requesting that a requesting processing resource sleep until it is unlocked if a target memory is locked

18. Claims 468,967,1466 and any relevant dependent claim(s).

Method, system or apparatus that involves determining value types by using a hash function as well as updating value types in a primary cache memory of a processing resource to a secondary cache memory for each type value, if each value type in a primary cache has not been updated to a secondary cache memories.

19. Claims 508,509,546,1008,1045,1507,1544 and any relevant dependent claim(s).

Method, system or apparatus that involves an event variable and the waking of a processing resource from sleep that is waiting on an event if the event value is set not to sleep.

20. Claims 581,1080,1579 and any relevant dependent claim(s).

Method, system or apparatus that involves wait-on semaphore instruction, signal-on semaphore instruction and operating system trap-call.

Since the abovementioned groups of claims do not appear to share any technical features, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept, a priori.